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Soil Conservation

DEVOTED TO THE WISE USE OF LAND AND WATER RESOURCES

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SOIL CONSERVATION SERVICE U. S. DEPARTMENT OF AGRICULTURE

Development . . .

People working together in the heartland valleys of the Nation are reaping the rewards of renewed economy and improved rural environment as they move forward with small watershed projects.

Work Unit Conservationist John Essman gives details (p. 219) of how one project brought new industry, jobs, and public facilities, including recreation, to a small Appalachian community.

From another State comes Soil Conservationist Everett Leadbetter's report (p. 228) of how conservation work crews operated by soil conservation districts give jobs to underemployed rural residents.

Such examples, duplicated by the thousands across the Nation, point a practical design for the expanding effort in rural community development, now of major concern to the Congress and the Administration.

Land in Between: This year's Soil Stewardship theme also focuses on our vital rural hinterland—the Land in Between, from which our cities and towns draw their sustenance and where urban people must turn increasingly for the amenities of pleasant living space.

We are challenged by the crisis imminent in public indifference to the Land in Between in NACD's annual Soil Stewardship booklet, *Crisis in the Countryside.* Executive Secretary Gordon Zimmerman introduces excerpts (p. 231) worthy of wide-spread repetition.

COVER: A small lake in the Caney Creek watershed, Cross County Soil and Water Conservation District, Ark., is typical of scores across the country providing new recreation opportunities as a result of small watershed projects.

Soil Conservation

Devoted to the wise use of land and water resources

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Reshaping Appalachia

Ohioans Build a Brighter Future Through Watershed Projects

By John L. Essman
Work Unit Conservationist, SCS, Caldwell, Ohio

TO BOLSTER a sagging economy common to many Appalachian communities, residents of Duck Creek Valley in southeastern Ohio first are reshaping their land and water resources.

Taking the challenge for a better life, the Buckeyes have enlisted county, State, and Federal aid to augment their own local ambition and literally "moved mountains" to bring prosperity back to their valley.

They are hard at work on the West Fork of Duck Creek Watershed Project, and the project's economic effects already are being felt throughout the valley.

Project contractors are hiring many local men.

Materials of all kinds are being purchased from local businesses.

Farmers are showing new interest in their land as they invest in sound conservation improvements.

Housing and commercial developments and a new airport are other indicators of a brighter future.

Water was the problem

At the root of Duck Creek's stagnated economy was the basic resource—water. Too many floods had combined with a municipal water shortage to bring hardship to most valley residents.

Steep hills and narrow valleys hemmed in tributaries of the 106-square-mile watershed drained by the West Fork of Duck Creek. Unharnessed water crowding through silt-clogged channels often spread across several thousand acres in the 24-mile-long valley.

More than once a year homes, highways, businesses, industries, and railroads as well as rich farmland bore the brunt of the onslaughts. Polluted municipal water topped off the problem.

In eight valley villages a total of 75 percent of the people were directly affected. An average of $79,000 in flood damages was being siphoned out of the valley's economy each year by the flood hazard.

Compounding the high-water problem, a water shortage threat continually hung over the valley settlements.

Gabriel Lerner of SCS makes an elevation check during construction of Wolf Run Reservoir.

Caldwell, the county seat and leading business community, had reached critical limits in depletion of its water supply reservoir.

Belle Valley, 3 miles upstream, was existing on well water that was inadequate in both quality and quantity.

Each wave of high water contaminated these wells, forcing residents to haul water from distant sources. Similar water shortages existed in varying degrees in nearby villages.

The watershed project

The resource problem came to a head in the late fifties after a series of floods that left a half-million-dollar trail of damages through the valley. Original thinking on a watershed protection project included both the West and East Forks of Duck Creek covering 183,866 acres.

Sponsoring groups headed by the Muskingum Conservancy District, Ohio's Department of Natural Resources, and Noble, Guernsey, and Washington soil and water conservation districts, decided too much was involved for a single watershed project. Two separate projects could expedite the work, they advised. West Fork, where the need was greatest, was given priority to move first.

Applying for aid under the Watershed Protection and Flood Prevention Act, Public Law 566, the sponsors got help from the Soil Conservation Service in planning the project measures.

The Ohio State Government gave the project's multiple benefits a big boost when it earmarked $328,000 of its capital investments fund for construction of the Wolf Run Lake recreation area in the watershed.

The Ohio Department of Natural Resources had been considering the recreation project for several years. Now the watershed project made the idea more feasible.

Adding this money to Federal watershed construction funds enabled the Department of Natural Resources and SCS planners to design a multiple-purpose dam that would provide municipal water for three communities and public recreation as well as floodwater storage.

Wolf Run Dam, with top priority for construction, became a key part of the watershed project. The existing Caldwell water supply reservoir, constructed in 1935, was slated to have an enlarged dam and spillway to add floodwater storage capabilities to its present use. Six additional dams, located in strategic parts of the watershed, were planned as the backbone of the project's structual improvements. Twenty miles of improved channels on the main stream were also scheduled to further reduce the high-water hazard.

Land improved, too

Needed land treatment measures were planned as an essential part of the project to augment the structural work. Erosion in the uplands had to be controlled to keep new channels and reservoirs free of sediment.

Of the 462 farms in the watershed, owners and operators of more than 30 percent were already cooperators with local soil and water conservation districts. Increased conservation farm planning assistance to these landowners and new district cooperators was provided by SCS through watershed funds.

Added technical aid for woodland problems came from the Forest Service. Stripcropping, diversions, ponds, and improved grassland plus other conservation measures were scheduled. The end result would hold topsoil in place, reduce excess water runoff, and thereby eliminate much of the sediment in the streams below.

By July 1964, the project work plan was completely developed, approved, and ready to be put in operation.

"Local interest in the project

Route 78 was often made impassable by raging floodwaters before installation of the West Fork of Duck Creek Watershed Project.

Floodwaters surround this typical Appalachian home along Duck Creek several times a year.

proved its real value here," recalls Robert Ball, chairman of the steering committee. "In record time we had all the easements and rights-of-way needed to start letting contracts on the first dam."

Ball, a native farmer and treasurer of the Noble District, had been a strong backer of the project for years. His 440-acre beef cattle farm had been flooded more times than he could remember.

"One year was especially bad," Ball comments. "We had 13 floods in 12 months. My place, along with dozens of others, was swamped. We couldn't exist too much longer with the problem."

Wolf Run Dam is now nearing completion. With it will come a 1,143-acre, State-owned recreation area surrounding the 220-acre reservoir. The facility will include camping areas, picnic grounds, boat docks and ramps, beaches, and ample room for good fishing. In addition, the villages of Caldwell, Florence, and Belle Valley will have nearly a half-million gallons more water a day available for municipal and industrial use—which will double their present supplies.

Confidence in their prosperous future is well indicated by the valley's new million-dollar Noble County Airport. Its 5,000-foot hard surface runway, carved out of two mountains and a valley, lies just above the new Wolf Run site.

Confidence in the future

Assured of flood protection and ample water supplies, the local people invested their own capital, equipment, and time in the airport. They predict that it will be a big drawing card in their drive to attract new industry and vacationists.

Further promoting this drive for new business, local leaders raised $1,000 for a full-page ad in the *Wall Street Journal*.

There are further signs that the valley is moving ahead. A 728-acre agricultural research center has been located in the watershed, to study agricultural and recreational uses of the hill lands of southern Ohio.

A $165,000 nursing home, just dedicated in December, will have a staff of up to 17 doctors and nurses. Its owner attributes its construction directly to the expected economic growth caused by the watershed project.

A 9-hole golf course has been built on flood-plain land, replacing 30 acres of continuous corn. Construction has begun on a new wood processing mill that will employ up to 25 persons. One new hotel has opened, and two apartment buildings are under construction. And more than $20 million worth of highway contracts will be let in the valley this year.

Word is spreading

Word of the project's success is spreading to neighboring valleys. East Fork of Duck Creek is proceeding with its watershed plan. Nearby Buffalo Creek has a project approved by Congress with land easements the next goal to be achieved. Other communities have similar Public Law 566 projects in various stages of planning.

Within the next 5 years Duck Creek Valley residents will see many results of their past years of planning and perseverance. Agricultural damages will drop an estimated 82 percent. Urban damages from floods will be all but eliminated, saving $15,000 a year. Another $20,000 will be saved each year on highways, bridge and railroad repairs.

Total costs for the project are estimated at $3,782,677. The Federal share is approximately $2,568,668, and State and local funds will cover the remaining costs. For each dollar spent the valley will gain $1.40 in benefits.

Commenting on their project's

Changing times around Caldwell are typified by construction of the Wolf Run Reservoir (middle) and Noble County Airport (background).

success, Ball says, "Our watershed project is a fine example of what can be done by local people who want to help themselves. Add this interest to the assistance we are getting from the State and Federal Governments and you have real democracy in action."

Duck Creek Valley will be a healthier, happier, safer, and more profitable place to live. The next generation will enjoy the long-range benefits. For this reason the Duck Creek Ohioans are glad they moved some mountains to make room for prosperity. ♦

Watershed Lakes Bring Recreation Activity to Kansas Flinthills

By G. W. Davidson
Work Unit Conservationist, SCS, Sedan, Kans.

WATERSHED construction in Chautauqua County has focused attention on Kansas' most scenic area.

Eighty lakes under construction in five Public Law 566 watershed projects headquartered in Chautauqua County are located in the rugged topography with clear streams draining from tall grass cover associated with the world famous Flinthill area.

This combination of clear lakes situated in an unbroken grassland area offers great recreation possibilities for this part of Kansas. These lakes are the permanent pool areas of floodwater-retarding structures ranging in size from 5 to 470 surface acres.

Two multiple-purpose structures are completed and a third is under construction. Two of the three are for municipal water supply and will have some recreation planned by the cities of Sedan and Caney.

The third furnishes 13,000 acre-feet of storage on a 3,000-acre Scout Ranch owned and operated by the Quivira Council, B.S.A., located at Wichita, Kans. The council purchased 8,000 acre-feet of storage for its aquatic program of fishing, boating, canoeing, life saving, and to provide recreation for a potential of 6,000 Scouts.

The SeKan Council, B.S.A., located at Independence, Kans., has taken a long-term lease on a 31-acre pilot watershed lake in the eastern part of the county to provide recreation for its camps. These two Boy Scout councils located camps in this county because of its rough wilderness appearance and plenty of clear fresh water.

The Caneyland Development Association was organized recently covering approximately 600,000 acres in the county and areas around the 80-lake complex. The primary objective of this organization is to furnish information to landowners seeking ways to establish income-producing recreation enterprises, particularly around permanent pools of watershed lakes. The organization is being assisted by the local Technical Action Panel Committee consisting of representatives of all Department of Agriculture agencies in the area.

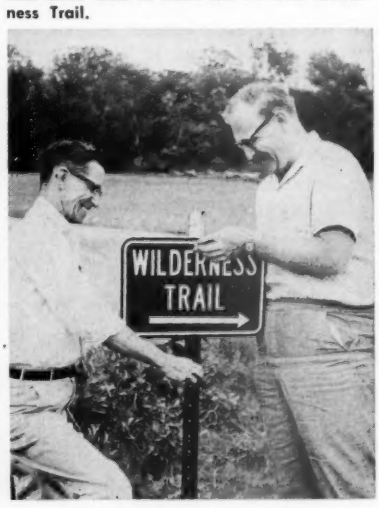
The local Chamber of Commerce initiated a redbud tour 6 years ago by marking routes in the county and publicizing the scenic drives. Each year the tour has grown, and now several hundred people drive hundreds of miles to see the redbuds in bloom.

A "Wilderness Trail" has been marked with large metal signs directing people through some of the most scenic areas and to sites having historical interest from the old frontier days.

Local people are organizing and becoming interested in projects that will attract tourists into this part of their State.

Recently, the two Senators from Kansas introduced a bill in Congress that would provide a Prairie Parkway Trail through the State and bisect Chautauqua County. The trail would offer an opportunity to see the Bluestem Hill country with all of its natural beauty and provide a direct route to this recreation area. ♦

The Reverend Clarence Brooks (l.) and Raymond Tredway of the Sedan Chamber of Commerce erect the last of 100 signs purchased by the Sedan Chamber of Commerce and Lions Club to mark the 75-mile Wilderness Trail.



SCS Assists Foreign Groups and Individuals

In 1965 some 416 foreign nationals received training assistance from SCS. This figure includes 242 members of groups or teams that visited the Washington Office and one or more field locations and 174 on individual assignments that varied from a few days to several months.

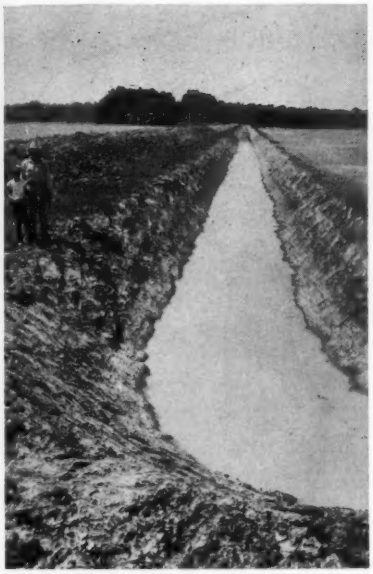
In total, these individuals and groups spent 4,429 man-days with SCS.

Either the Agency for International Development, the Food and Agricultural Organization of the United Nations, private foundations, or their own governments sponsored the individuals and groups. A few came at their own expense. ♦

In watershed projects . . .

Channel Improvements Aid Water Control and Use

By E. D. Butler
State Conservation Engineer, SCS, Little Rock, Ark.



On relatively flat lands with gentle gradients, improved channels need not be lined.

STREAM CHANNEL improvements serve many uses in the small watershed program under Public Law 566.

Where land treatment measures and floodwater-retarding dams alone cannot provide enough flood protection to a watershed, natural drainageways are enlarged enough to carry excess runoff safely within streambanks or to remove floodwater before significant damage occurs.

Improved channels also serve other useful functions, including agricultural water management, diversion of water to control erosion and sediment, recreation, and other purposes—either singly or in combination with flood prevention.

The importance of stream channel improvements is indicated by the fact that they comprise 31 percent of the total cost of all structural measures planned on Public Law 566 watershed projects as of last June—$220.2 million out of $717.2 million.

Large and small

Some of these are large concrete-lined channels that protect valuable urban property. Others are small earth channels that protect agricultural crops. Most of the channel improvement work in Public Law 566 projects is somewhere between these two extremes —medium-sized ditches protected with some natural vegetation and grade stabilization structures.

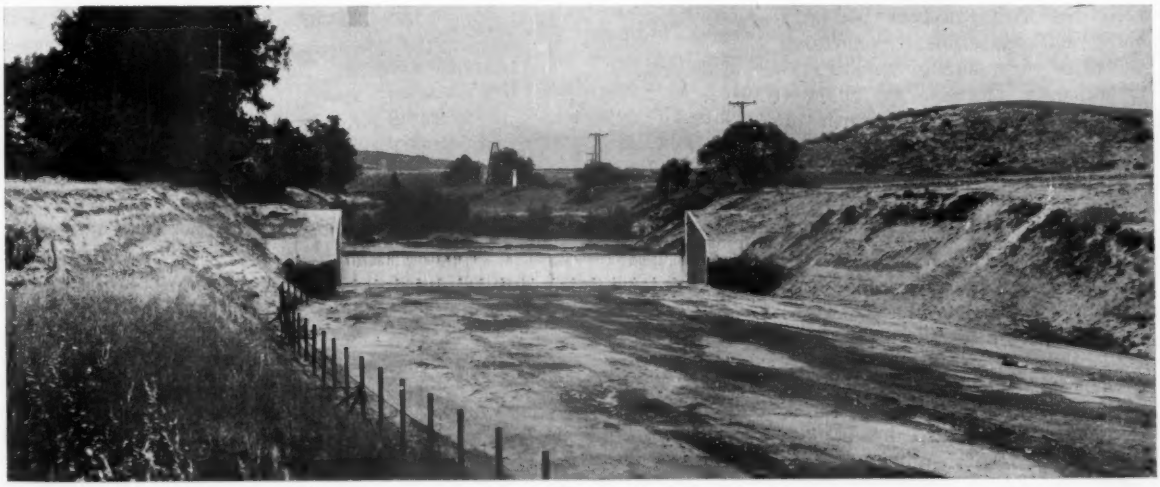
The purpose, location, bed and bank materials, and cost of channel improvements all have some bearing on the criteria and procedures used to design and construct the channels.

Complex channel improvement work, involving peak runoff determination, bank erosion and channel degradation problems, and soil materials testing, requires the skilled services of a design engineer, hydrologist, geologist, and the materials testing laboratory. On channels that have gentle gradients and stable soils, a less specialized technical approach can be used.

Design methods

Depending on the level of protection required, design discharges for channels are determined by one of two methods.

A reinforced concrete drop spillway is one form of structure useful for stabilizing channels.



One method is to design the channel for a peak rate of discharge for a selected frequency of occurrence. An example might be a channel benefiting an urban area where the project objective is to provide protection from a storm expected to occur only once in a hundred years.

The second method is to determine the rate of discharge required to remove a volume of runoff within a specified time. This method is often used on agricultural land where it is impractical or uneconomical to construct a ditch large enough to prevent temporary flooding. The channel is designed to remove floodwater in a predetermined number of hours before significant damage occurs to crops.

One of the most difficult phases of channel design is planning unlined earth channels with acceptable limits of stability. Two procedures are used by SCS to establish these limits: (1) The allowable velocities procedure and (2) the allowable tractive force procedure. These procedures are based on the concept that movement of the materials in the bed and banks of a channel will not occur if certain conditions of flow with respect to the soil materials are met.

The allowable velocities procedure is based on past experience and limited research on water velocities with different bed and bank soil materials. Nonerosive velocities vary on a given soil material with changes in channel alinement, bank slope, depth of flow, suspended load and bedload, and other factors.

The allowable tractive force procedure may be used for coarse-grained soils. This method evaluates the shear at the interface between flowing water and the periphery of the channel. The ability of soil materials forming the channel to resist these shear forces is then calculated from properties determined by laboratory and field tests. When unstable banks or channel beds are anticipated, protective linings or grade control structures are provided.

A concrete-lined major channel provides flood protection for urban as well as rural residents.

Linings and structures

Bank protection and channel linings are used to protect channel surfaces against erosion caused by movement of water and transported materials and from shallow surface sliding. This protection is provided by using vegetation, revetments, retards, rock riprap, rock and wire mattress, sacked concrete, grouted rock riprap, concrete paving, and other materials, depending upon site conditions and erosion hazards.

Grade-control structures are used to reduce the gradient in channel reaches where the channel materials will not resist erosive forces. Reducing the gradient reduces velocity.

Drop spillways, chutes, culverts, hooded inlets, and drop inlets are all used for grade control. The site configuration, foundation condition, availability of structural materials, hydraulics and structural adequacy, and economic factors all help determine the suitability and design of these structures.

An example of the benefits from stream channel improvement is the Caney Creek watershed, covering 40,000 acres near Wynne, Ark. This project was planned with seven small floodwater-retarding structures, 40 miles of channel improvements, and 354 acres of critical area stabilization. The channel improvements, costing $330,000, are low-velocity unlined channels with corrugated metal pipe overfall structures that provide grade control where side drains enter the channels.

Benefits to a city

The channels benefit the city of Wynne and 20,000 acres of agricultural land. Before the project was completed in 1965, approximately one-third of Wynne was flooded by each storm. Many streets and stores were flooded an average of five times each year. Moving merchandise out of reach of floodwater was a regular job.

After the project was installed, Mayor Harold N. Falls of Wynne said, "More than 6 inches of rain was received last September 10 and 11, and no flooding occurred in the city. In fact, the ditches that run through town were at only about 40 percent of their capacity."

Gilbert Quessenberry, manager of Wynne water and sewer system, said, "In the 23 years that I have been affiliated with the city water system, this is the first time that all storm sewers emptied immediately after a heavy rain."

Local interests spent approximately $50,000 rebuilding bridges in the watershed while channels were being enlarged. County Judge Homer Mitchell said, "None of the county roads in the watershed was flooded by the large rains received the first part of September. I was highly pleased with the watershed channels because both the county roads and farmers' crops were protected. The 33 bridges in the watershed will last a long time because proper channels have been constructed to carry all runoff without damaging roadbeds and bridge structures. I wish that every watershed in the county had the same treatment." ♦

Snow Survey Indicates Good Water Supply

Good-to-excellent water supplies are in prospect for most of the West this summer, according to preliminary reports from snow surveys conducted by the Soil Conservation Service and cooperating agencies.

Snowfall to February 1 ranged from 80 to 100 percent of average for the date with few exceptions. In addition, the high runoff last spring left reservoirs with more than usual water in storage—especially those reservoirs that serve irrigation and municipal needs.

Given average snowfall for the rest of the season, the combination of high carryover storage and average streamflow is expected to provide reasonably adequate water supplies this summer.

The only deficiency in snowfall existed in eastern Oregon and southeastern Washington, extending into northern Nevada. ♦

River Basin Districts Plan for Water Management in Mississippi

By W. L. Heard
State Conservationist, SCS, Jackson, Miss.

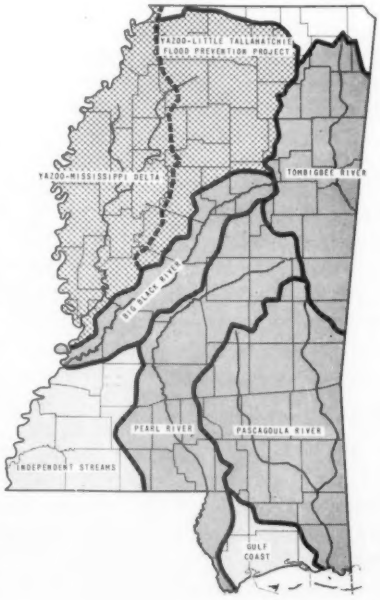
MISSISSIPPI is providing for comprehensive river basin studies and water resource development through a new type of water management district created by individual acts of the State legislature.

Each district consists of a river basin several times the size of watersheds authorized for projects under the Watershed Protection and Flood Prevention Act.

Funds and authority

The districts are provided with funds from State and county sources and have broad authority to carry on resource development and conservation activities.

Four such river basin districts now cover about two-thirds of the State. Most of the remainder is included in the Yazoo-Little Tallahatchie flood prevention watershed and Mississippi delta lands covered by other river basin studies.



Water resource studies and development programs for practically all of Mississippi have been provided for through (1) river basin water management districts covering the Tombigbee, Big Black, Pearl, and Pascagoula River basins, (2) cooperative comprehensive river basin surveys for the Independent Streams and Gulf Coast areas, and (3) the USDA flood prevention program for Yazoo-Little Tallahatchie and a comprehensive river basin survey for the Yazoo-Mississippi Delta areas.

These locally managed action agencies are a logical outgrowth of earlier basin studies conducted by USDA agencies in cooperation with the Mississippi Board of Water Commissioners. The studies on the Tombigbee basin, the Yazoo River Delta, and other areas provided basic information for planning small watershed projects and other conservation programs, but there were no basin-wide action programs.

Tombigbee Valley District

The State Legislature authorized the organization of the Tombigbee Valley Water Management District, the first of the four, in 1960. It provided a way for the governing bodies of the 16 counties in the river basin to join in the common effort. It gave the district broad powers to translate plans into action. It further provided for member counties to assess one-half mill in taxes and for the State to return four times as much for the operation of the district. Today about half the counties in the eligible area in the northeastern part of the State have qualified for membership, the district is organized, and work is under way.

Then conservationists in south-

eastern Mississippi made common cause with a group seeking to develop the Pascagoula River for navigation and organized the Pat Harrison Waterway District. Enabling legislation put the 15 counties in the basin in the district but provided that a county might be removed by its supervisors. None withdrew. Each county supplies one-half mill of tax money to the district, and the State returns 1½ mills.

The Legislature also passed legislation enabling the counties in the basins of the Pearl River and the Big Black River to set up river basin water management districts. Financing arrangements are somewhat similar to those of the Pat Harrison District, but the basis for counties to enter the district varies.

The Pearl River Basin Development District is organized and functioning but without the participation of all of the 21 counties having some land in the basin. Supporters of the Big Black River Basin District hope to solve their organizational problems and have the district in operation within the year.

Basic functions

While details of State authorizations for the four river basin water management districts vary, they all provide for three important functions:

(1) An effective and widely representative organization that can cooperate with Federal and State agencies, agencies of other States, and subdivisions of State Government, to plan and establish measures for the development of the basin's water and related land resources.

(2) Reasonably adequate financing from State and county sources.

(3) Broad authorities to construct, own, and operate such structures as reservoirs, dams, levees, canals, and related water development projects "to insure adequate water supply for domestic, commercial, municipal, industrial, agricultural, and recreational uses." They also provide for activities in soil and water conservation, flood control, pollution abatement, timber development, navigation, and irrigation work.

How they work

How do the districts work?

They cooperate with the Mississippi Board of Water Commissioners, the Corps of Engineers, and the agencies of the Departments of Agriculture, Interior, and Health, Education, and Welfare in developing programs and projects that have appropriate local sponsorships. Their purpose is to promote economic development in cooperating areas.

Each basin water management district promotes the active development of small watershed projects, which are sponsored by local soil conservation and water management districts under Public Law 566. Three basin districts are financing planning parties to develop 12 small watershed projects. They have set up $495,000 in trust fund agreements for the planning activity, including approximately $150,000 in the Tombigbee River basin, $120,000 in the Pearl River basin, and $225,000 in the Pascagoula River basin (Pat Harrison District).

Sam H. Loftin, Jr., president of the Pat Harrison District, says the district would also help with small watershed projects by defraying legal costs, rights-of-way, and other local obligations. "We have set no limit on our financial assistance to these projects but will base our help on merits and needs in each case."

Small watershed projects

P. T. Lagrone, general manager of the Pearl River Basin Development District, says that the small watershed program is the backbone of basin development, at least in the early stages. The directors, he said, will push for the development of a small watershed project on Richland Creek to protect an expansion area for the city of Jackson, for projects to reduce sediment and control runoff into the Pearl River Reservoir, and similar measures. They will push, too, for a Corps of Engineers dam above the reservoir.

The general plan is that the river basin water management districts will sponsor and promote Public Law 566 projects with USDA assistance to secure local benefits. When benefits extend beyond the local area, as with a multiple-purpose reservoir providing recreation facilities, the river basin districts will share in the costs.

The Corps of Engineers will cooperate with the river basin districts to build dams and improve channels on the main stream and do other work of direct benefit to large segments of the basin. Agencies of the Departments of Interior and Health, Education, and Welfare cooperate in their fields in any phase of the work.

Comprehensive river basin plans will be of the "open end" variety. The river basin water management districts will coordinate studies by all agencies and develop plans for future action. Objectives for the next 50 years will be set but planning will be in less detail. Plans and action programs will be adjusted according to changing needs over the years.

And most important is the fact that the people have strong organizations with authority and financing to carry out the objectives. ♦

125,000 Rural People Helped by Loan Program

In the first full year of operation, Economic Opportunity loans advanced by the Farmers Home Administration helped nearly 125,000 low-income rural people increase their incomes and raise their standard of living. ♦

Drop-Inlet Dams Replace Bridges and Save Millions in Road Costs

RESIDENTS along the Missouri River Valley in western Iowa and eastern Nebraska have a unique problem. Gullies get too big for their bridges.

These people also have a unique answer. Unlike the mother who simply buys a bigger pair of breeches as her son enlarges, these folks girdle their land with erosion control structures.

This program for replacing wornout bridges saves tax money, makes for safer roads, and keeps additional soil from washing down the already muddy Missouri.

Savings in millions

Installing earth dams with drop inlets for bridges is not a new idea. This cooperative venture among county road officials, farmers, and the Soil Conservation Service originated in at least one Nebraska county back in the 1930's. But only recently has the practice spread, as many counties find that it saves money.

Washington County, Nebr., has replaced more than 200 bridges with erosion control structures since 1935 saving an estimated $1 million or more in the process.

Across the river, Shelby County, Iowa, has replaced more than 200 bridges with earth dams and drop inlets since 1951, with an estimated savings upwards of $\$^3/_4$ million. Shelby officials found they averaged a reduction of $4,000 a structure in construction costs alone by using culverts instead of building new bridges.

Other Iowa and Nebraska counties are now adopting the practice. Appanoose and Pottawattamie in Iowa and Saunders and Nemaha in Nebraska are examples reporting favorable results.

In addition to reducing bridge upkeep cost and insuring safer roads, the drop inlets provide grade stabilization benefits to landowners. Grade stabilization reduces erosion losses and cuts down the number of dams needed in watershed programs.

A problem of loess soils

The problem of deep gullies endangering bridges is largely confined to the highly erodible loess soil areas such as the Iowa-Nebraska region. The problem is accented by steep slopes where the terrain dips down to meet the Missouri River valley.

Mill-Long Creek in Washington County, Nebr., for example, drops 200 feet in the final mile before it enters the Missouri River. Gullies in this county just north of Omaha have many overfalls 10 to 50 feet high.

The Mill-Long and Moores Creek watersheds alone had 440 overfalls and 45 miles of gullies. Often a watershed dam and a drop-inlet road structure stand within 100 yards of each other, stabilizing at least 50 feet of grade.

The drop inlets also help sustain water levels in wells. Prior to installation of drop inlets, creek beds eroded deeper with each rain, causing a lower water table and necessitating the deepening of wells. Washington County officials find drop inlets have revived many wells.

Usually the county engineer and an SCS technician drive over the county each fall to determine which old bridges should be replaced by drop inlets the following year. The drop inlets are then designed by SCS personnel to handle the estimated peak flow of a 50-year flood. ♦

Residents of Washington County, Nebr., see a new drop-inlet culvert that will replace the old bridge they are standing on.

For human and natural resources . . .

District Work Crews Make Jobs as They Heal Land

By Everett R. Leadbetter
State Soil Conservationist, SCS, Morgantown, W. Va.

WORK CREWS of West Virginia soil conservation districts provide a direct answer to Appalachia's dual resource problems—the conservation of both human and natural resources.

The crews, employed and supervised by the districts to install conservation practices under contract on the land of cooperators, provide jobs for underemployed local residents while they heal the scars of erosion-damaged lands.

All but one of the 14 districts in West Virginia employ labor crews. They are used mainly for planting trees, shrubs, grasses, and legumes. Last year they employed 397 men for 6,480 man-days of work, for which land owners and operators paid $192,935. The result was 4,652 acres of trees and shrubs and 447 acres of grasses and legumes planted.

A spreading practice

Shortly after districts were organized, they started employing local workers, mainly as equipment operators and occasionally for tree planting, fencing, and woodland improvement.

The Little Kanawha District in 1955 led the way in demonstrating the advantages of well organized and trained crews whose services could be contracted to landowners. Within a few years other districts were following their lead.

The trend was speeded by an amendment in 1959 to the State's strip-mine law which resulted in districts becoming responsible for doing most of the revegetation work on strip-mine spoils, a major job in all but three of the State's districts.

Last year this work resulted in employment for more than 70 workers each in three districts. The Little Kanawha District, with no strip-mine spoil, still had work during the height of the planting season for 60 men. This district has found also that a small labor force employed year-round is feasible and a valuable aid to conservation work.

Luther Britton, supervisor in the Monongahela Soil Conservation District and president of the State Supervisor's Association, has supervised a planting crew for about 10 years.

He says, "I like a crew of 8 or 10 for planting trees. On strip-mine spoil the planting goes a little slower, but they still plant 600 to 700 trees per man-day and occasionally as many as 1,000. When using these trained planting crews we generally get a better quality job than the land owner would do for himself."

Technical supervision

Crews are trained by and receive limited supervision from technicians of the Soil Conservation Service and the State Department of Natural Resources.

Many district supervisors, in addition to recruiting and scheduling the crews, find time to check on progress of the work.

Land owners and operators are informed of the services available through their district by the SCS conservationist at the time the plan is being made. When a cooperator desires services he contracts for them with the district supervisors.

Some districts now provide complete planting services. They buy, transport, and care for the planting stock. They see that the job is properly done before presenting the statement for payment. Such a package deal is especially advantageous to the absentee landowner and to those employed full time with off-farm work.

District employees use the district's equipment to plant trees on graded strip-mine spoil in the West Fork SCD, W. Va.

SCS Soil Conservationist Maurice Allman (below) tests strip-mine spoil for acidity in planning for revegetation. Then a small planting crew (r.) plants trees under supervision of the district.

The conversion of exposed strip-mine spoil to a shady grove follows quickly after a quality planting job by a trained crew. This black locust stand is 5 years old.

Plantings by other than district crews have remained fairly constant, while the volume of planting by district crews has shown a gradual increase for several years. Last spring, district crews planted more than three times as many trees and shrubs as were planted by all others on the land of cooperators.

Prospects seem good that the trend in use of labor crews will continue. Supervisor Luther Britton says these are men who need the work and that the districts need them. It's the only way the planting job can be accomplished. ♦

Manty-Harju Is Woodland Mecca

AN IDYLLIC-SOUNDING mecca by the name of Manty-Harju near Placerville, Calif., is visited each year by hundreds of folks of Finnish forebears who enjoy the traditional sauna bath plus the hospitality of Mr. and Mrs. Arthur Kylander.

Manty-Harju means "pine ridge" in Finnish. In California, it means a tree farm which has become a model for woodland conservationists the world over.

Kylander, 73, migrated from his native Finland to America at 22, worked his way as woodsman and carpenter from Maine, New York, Pennsylvania, Ohio, Minnesota, and finally to California. There he and his wife, Julia, invested their savings in a tree farm which they named Manty-Harju.

Kylander's interest and ability in silviculture and woodland conservation began in the forests of Finland where he played and gathered firewood as a boy. When he acquired Manty-Harju, he became a cooperator with the El Dorado Soil Conservation District and was assisted by the Soil Conservation Service in developing a woodland conservation plan. His first cutting of merchantable timber for immediate income and to give younger trees growing space netted 2 million board feet which sold for $3 a thousand.

The woodland conservation plan also called for removing shrubs, unmerchantable trees, and less desirable species to improve the stand. All wood products were salvaged, the firewood being sold to homeowners and the local hospital and posts and poles to the State fair.

Rough lumber brought more profit than saw logs, so Kylander built a one-man sawmill which has produced about a million board feet of lumber.

Kylander used some of the lumber to build his home, garage, three guest cabins, outside cookhouse and a large sauna bath—"no selfrespecting Finn would be without one."

Arthur A. Kylander and some of the Douglas fir Christmas trees he planted in 1959. In the background are pruned Ponderosa pines.

Managed harvesting, thinning, prunning, land clearing, tree planting, and firebreak construction were among the woodland conservation practices applied by this tree farmer. He also installed an irrigation system for 22 acres of Christmas trees.

"This type of work is the secret of staying young," said Kylander.

It's the secret also of the kind of respect that won for him the Goodyear Tire and Rubber Company "Outstanding Conservation Farmer of the Year" award in El Dorado County SCD in 1964.—CHARLES E. MATSON, *Work Unit Conservationist, SCS, Placerville, Calif.* ♦

Greenspan to Help Preserve Open Space

A new "Greenspan" operation of the Cropland Adjustment Program offers cities, counties, and State Governments opportunities to acquire farmland for use as open space and parks.

Grants are available through the program to enable local governments to increase the permanent retirement of cropland to such noncrop uses as preservation of open spaces, natural beauty, the development of wildlife and recreational facilities, and the prevention of air and water pollution.

Greenspan grants may be used for the acquisition of land and for conservation work on the land. Such grants will not exceed amounts that could be paid on the same land through the Cropland Adjustment Program. ♦

Watershed Forum Reviews Progress

"New Tests in America's River Basins" is the theme of the 13th National Watershed Congress in Oklahoma City, May 15 to 18.

The National Watershed Congress, sponsored by more than 20 of the Nation's leading industrial, agricultural, and conservation organizations, is dedicated to improving natural resource management and use. The yearly meetings afford an overall review and discussion of watershed programs, problems, and progress.

The proceedings contain papers of professional and nonprofessional leaders dedicated to improving the water wealth of the Nation.

One of the highlights of the annual meeting is the presentation of two awards to the Watershed of the Year and the Watershed Man of the Year.

Three basic standards are used in selecting the Watershed of the Year:

(1) The extent of interest and participation by all agencies and groups within the watershed, (2) adequacy of the project in meeting all of the natural resource conservation and improvement needs of the watershed, and (3) present status of completion of the project.

The Watershed Man of the Year award is made, on the basis of nominations submitted to the Awards Selection Committee, to an individual who has made outstanding contributions to the progress of watershed programs. ♦

Crisis in the Countryside

Theme of Soil Stewardship Week 1966

Each spring, thousands of clergymen and their congregations in the 3,000 conservation districts throughout the country observe Soil Stewardship Week as a time for special attention to the moral obligations and responsibilities all of us should accept for the conservation of natural resources. An increasing number of farm, civic, and other organizations are including time in their programs for recognition of these responsibilities.

An advisory committee composed of leading clergymen representing several church denominations each year meets with the National Association of Soil and Water Conservation Districts to select a timely theme for the annual observance. Each theme, enlarged in booklet form, is designed to emphasize that the basic motivation for conservation and orderly development of natural resources is man's recognition of his responsibility under God to protect and use wisely His precious gifts of soil and water.

The material that follows is excerpted from the booklet entitled "Crisis in the Countryside," which was developed by this advisory committee and distributed by NACD for use during 1966 Soil Stewardship Week, May 15-22. We believe the theme is particularly timely because it focuses attention on current forces and trends which can have a lasting influence, for good or bad, on that vast part of America lying between its cities.
—GORDON K. ZIMMERMAN, *Executive Secretary, NACD.*

SOIL STEWARDSHIP lives in the spirit of a responsible people at work on the land. As never before, this spirit is being tested and the work is becoming more critical. The reasons lie in the rapidly changing character and goals of our country.

The land in-between

We have become, predominantly, a nation of city-dwellers. Each day and each year, more and still more Americans concentrate in the towns, cities, and suburbs. To them, life is centered there. . .

What, now, happens to the countryside? Never have so many Americans known so little about it. Increasingly, it becomes a kind of obstacle in time and space separating cities—the vaguely identified "land in-between" which must be crossed quickly by highways, trains, and planes.

Among the new and city-oriented generations, there is danger that the land in-between will be regarded increasingly as mere "undeveloped" space. In their preoccupation with urban and user needs, there is risk that a majority of Americans will lose sight of the vital functions of the countryside and depreciate the necessity of soil stewardship.

The price of plenty

The evidence of present plenty in the bulging supermarkets and shopping centers of the country dulls the sharp edge of urgency in the call for soil stewardship—for the conservation, wise use, multiple use, and orderly development of vital soil and water resources. The land is the source of our ample food supply and since there is anything but a shortage of food, why worry about the land? . .

The supermarkets are still full. Widespread public indifference toward resource management is a price we pay for present plenty. It is also a root cause of the impending resource crisis in the countryside.

Distortion of values

Headlong expansion, spurred by mammoth economic growth, sustained industrialization, and the material demands of our rising population, carries with it the simultaneous perils of waste, mediocrity, and the emergence of false shrines. Nowhere is the jeopardy greater, and the responsibility of soil stewardship correspondingly larger, than in the American countryside.

We find ourselves in an age demanding instant satisfaction of ill-considered demands—often hypocritically made in the name of progress and society. Irreplaceable vistas of unique natural beauty give way to the vast growth of highways most notable for the density and offensive taste of the signs and structures which constrict their edges. Motor oil and

The Soil Stewardship Advisory Committee for 1966 is composed of the Reverend E. W. Mueller, D. D., of the National Lutheran Council; The Right Reverend John George Weber of the National Catholic Rural Life Conference; the Reverend Lewis W. Newman, D. R. E., of the Southern Baptist Convention; the Reverend Harold S. Huff of the National Council of the Churches of Christ in the U.S.A.; and the Reverend Henry McCanna, D. R. E., of the National Council of the Churches of Christ in the U.S.A.

gas defile once-clear mountain lakes just as the excretion of our cities is allowed to pollute our rivers. Housing pushes outward rank on rank without a breath of green space. And some of the most fertile farmland in the world is sacrificed to the onslaught of factories and asphalt-covered shopping centers, which presumably could be located nowhere else.

Growth itself is not the culprit, for growth in constructive works and development of a fruitful environment for man are surely to be encouraged and praised. It is the indiscriminate use of our God-given resources, the distortion and failure to recognize relative values, that invite and deserve censure. . .

The countryside is the great inland reservoir of nature. It deserves care and protection against the exploitation and miscalculation of values which now contribute to the crisis in the countryside.

Breaking the farm barrier

. . . More than agriculture is at stake in the countryside.

The quality of water management in the countryside, for example, has consequences far beyond farm production. It bears upon flood prevention, water supply, navigation, and power. It affects fish, game, and wildlife. It can be a vital factor in local economic growth, pollution abatement, and recreational development.

The benefits of soil stewardship go well beyond farmers. Responsible stewardship, in its broadening performance, involves more than protection of land against damage. It extends to the enhancement of natural beauty in the countryside, to outdoor recreation, forestation, and the reclamation of wastelands. It involves the careful allocation of lands to multiple uses, in a range including timber production and water storage, housing and highways, grazing and nature trails, crop production and wildlife. . .

The pressures on leadership

No one can yet forecast the full dimensions of the changes now under way in agriculture and across the countryside of America. Enough is already apparent, however, to indicate they are vast and carry with them the seeds of new attitudes, new social and economic arrangements.

The transition under way on all sides imposes new tests on soil stewardship; it cries out for the assertion of leadership by those who take seriously their responsibilities to God for the soil, water, and other resources entrusted to us.

The needs are more than evident. There is need to re-identify the resource assets of each community, county, and conservation district —project the probable demands that will be made on these resources —and guide the development and use of these same resources along wise and orderly lines.

There is need to develop a countryside purpose—to identify the principles and goals of the countryside and make them known. There is need for leadership to spell out basic values which must be considered and conserved. There is need to re-assert Man's everlasting responsibilities for stewardship under God.

There is need for leadership in the church, in conservation districts, in farm organizations and chambers of commerce—among conservationists, tradesmen, bankers, and newsmen—to identify the array of new issues now facing the countryside and the soil, and devise constructive programs for dealing with them.

Facing the crisis

If ever there was a time for the resurgence of a spirit of soil stewardship, it is now. The tide of demand for land and water is running high—and will rise higher. Acquisition is the goal and the transactions multiply.

The land is limited. It is fixed in place, fixed in amount, and it must be used where it is. Only the uses and conservation (or lack of it) are ours to dispose. We can use land for farming or factories, housing or wildlife, highways or forests, and so on. We can decide to use it wisely or otherwise. The choice is ours, if we will exercise it rationally under God, to make it yield a full range of desirable soil and economic products at the right time and from the right place—without impairment of the resource itself.

A time for speaking

Silence is golden, according to an old maxim, but in a time of crisis it can also be costly. When vital issues are at stake, silence denies democracy and invites oppression. It can signify fear or cowardice, but more often it signals a man of little faith and less conviction.

This is a time to speak for the unity of the countryside in all its values and uses. It is a time to advocate the protection and development of our resources as a whole, in accordance with their capabilities and the community's goals. It is a time to speak for action that will meet the oncoming demands of our growing society—and forestall premature and disorderly commitments of resource use.

The present crisis in the countryside is a time for speaking. It is a time, for all those who genuinely believe in the values of conservation and in the obligations of man to God for stewardship of His natural resources, to come forward and be heard. ♦

New Conservation Agreements

Eleven States and one territory are now covered by modernized conservation agreements with USDA. They are: Arkansas, Connecticut, Louisiana, Maine, New York, North Dakota, Ohio, Rhode Island, South Carolina, Vermont, Wisconsin, and Puerto Rico. ♦

Never too Old for Conservation

WHY would an elderly man want to do woodland improvement work from which he will never benefit?

That's the question people might ask J. N. Buchanan, the oldest active cooperator with Ohio's Guernsey Soil and Water Conservation District.

At the age of 97, Mr. Buchanan is working diligently to leave his woodland in a productive state for future generations. He believes that a good woodland is an asset to any farm. He knows that wise land use demands that the steeper slopes and draws be maintained in forest trees.

"I expect to receive few, if any, financial benefits from my efforts in the woods," Mr. Buchanan says. "We landowners must preserve the natural resources of our farms and leave them to the next generation in better condition than we received them.

"There is much personal satisfaction in producing a good woods and knowing that greater returns will be realized in the future. We never get too old to contribute to the conservation of our natural resources."

Buchanan was born in December 1869 on a farm near the Ohio River in West Virginia. At the age of 11, after the death of his mother, he went to live with a farm family in Missouri, where he stayed and worked until he was 20 years old.

The next 20 years he worked as a railroader for various railroads

Mr. Buchanan stands beside the stump of a large beech that was removed to make room for younger trees to grow.

throughout the United States. In 1906 he purchased a farm in Licking County, Ohio, on which he ran a dairy until 1924. Since that time he has owned and operated several grocery stores and filling stations.

In 1950 he purchased a 100-acre bottom-land farm in Guernsey County near the city of Cambridge. He immediately became a cooperator with the Guernsey District. He says, "I often think how much better job I could have done on my farm in Licking County if the Soil Conservation Service had been available to give me technical assistance."

In 1963 he bought the first 72 acres of a second farm in Guernsey County and sold the bottom-land farm. He soon added an adjoining 100 acres. Both tracts had been badly neglected and were grown up to a jungle of thorn bushes and elms.

As each farm was purchased a cooperative agreement was signed with the district and a conservation plan developed. Corn and small grain were grown in rotation on the bottom lands. Second bottoms and the hill land that could be worked safely with a tractor were cleared and established in good pastures and meadows. This left the steeper slopes and rougher land to be maintained in existing woods or planted anew.

Mr. Buchanan not only practices good land use but uses necessary conservation measures. The year 1966 will see the last of the pastures treated and meadows established.

Mr. Buchanan is improving his woods at the rate of about 10 acres each year. He hires a man to do most of the work but is in the woods himself helping with the job almost every day.

Two of the three woodland areas have been fenced against livestock. The third will be fenced in 1966. —GEORGE W. EIKENBERRY, *Work Unit Conservationist, SCS, Cambridge, Ohio.* ♦

Nursery Adds a Touch of Beauty

Bill Jung and the author inspect an array of chrysanthemums planted on the contour and protected by a diversion.

A COMMERCIAL nursery is a beautiful thing when flowers are in bloom, but one whose owners are conservation minded is a breathtaking sight.

On the Jung Seed Company farms in Randolph, Wis., many-colored chrysanthemums, bright in the late summer sun and growing in gently curving contour rows, add unusual beauty to the countryside. Peonies bloom in early June, and their colors accentuate the rows planted parallel to a diversion that protects the sloping land on which they grow. Irises, flowering on terraced land, attest to the importance attached to conservation farming by the seed company.

Until 1955, erosion from heavy rains was a problem. The runaway topsoil covered low-lying fields, ruining valuable crops. It filled a road ditch and coated the road, causing a driving hazard until removed by highway maintenance crews.

Gullies began to appear, and 3- to 4-foot-deep eroded draws could not be crossed with farm machinery.

But in 1955 the seed company management, as cooperators with the Columbia County Soil and Water Conservation District, began a field-by-field and farm-by-farm attack on erosion.

Ten acres of grass waterways were shaped and seeded; one waterway having an 800-acre drainage area was stabilized at the outlet with a concrete drop-spillway structure. Seven miles of terraces were planned and built to permit the intensive cultivation necessary in nursery and seed corn farming. Some 4,500 feet of diversions were built to protect previously wet pockets. Shelter belts are planned to protect the crops from wind erosion on light soils.

Today the fields are uniform in productivity. Crops mature evenly, an important factor in any kind of farming, but especially so in commercial seed production.

And they know that good stewardship of their land is helping them supply customers with quality seeds and plants and a generous helping of rural beauty.—WARREN J. FITZGERALD, *Work Unit Conservationist, SCS, Portage, Wis.* ♦

Sam's Lake

Watershed dam gives farmer something to share with neighbors

Sam Sowell's neighbors gather to hear SCS Work Unit Conservationist J. L. Holdman explain the purpose and function of a watershed structure. Groups have also gathered there for picnics and baptizings.

SAM SOWELL owns a watershed lake. That is, he owns the land where the dam was built and has control of the water in the normal pool.

When the Upper West Red River Soil and Water Conservation District and the Natchitoches Parish Police Jury in Louisiana asked for easements for the Bayou Dupont watershed, Mr. Sowell was the only landowner who came in voluntarily and asked to sign. Now damsite No. 9 is on his land, and he has a 15-acre lake behind it.

But that's only part of what Sam Sowell has. He has neighbors, who come to fish in his lake. "They help me with my cotton chopping and picking, and I let them fish," he says. He charges no fee.

Since 1959, when the dam was built, he has had five baptizings. Both white and Negro churches use the lake. He is proud of that record.

School groups visit Sam's lake, learning about watersheds, flood prevention, and conservation of natural resources. Because of the good maintenance job the district and the police jury have done, it makes a beautiful outdoor laboratory.

The landowner, Sam Sowell (l.), tells M. E. Winn, supervisor of the Upper West Red River District, how "his" lake is used for recreation and livestock water.

Above the dam Sam has crimson clover and common bermudagrass for extra grazing for his 22-cow herd. He has renovated 64 acres of pasture to get better protection for the land and better grazing. He has weeded out the culls in 22 acres of woodland and has a good stand of desirable trees. He plants cover and green manure crops on cultivated fields.

Now hear what Sam Sowell doesn't have.

He doesn't have any floods at all on his good, level land along Brushy Bayou. From the time he put in his first crop in 1917, old Brushy had flooded every winter. Once out of every 4 years, it would take away his crop. But no more.

There is no more scouring of topsoil, forcing him to plow again to get up enough loose soil for a

seedbed. No more planting over, sometimes twice.

He didn't have 5 or 6 feet of water over his bottom lands after a 15-inch rain in September 1961. That storm didn't even put water through the emergency spillway; it stayed behind the dam and quietly waited its turn to get out. Years ago he would have had to swim down his cotton row, if he had any reason to go at all. When the water went down he would have had sediment covering the stalks and lint, if any.

Sowell has been cooperating with the Upper West Red River District on his 140-acre farm since 1954. At age 71 he walks over his fields with a cane and opens the gate instead of jumping the fence, but there is a freshness of understanding in his story of floods and crop losses that he once had but is now free from. His son, Amshell, who lives up the road, does the farming now.

Lee Holdman, for many years SCS work unit conservationist serving the upper West Red River District (now area conservationist, Denham Springs, La.), visited Sam regularly to help him with his conservation work and to pull an "eyeball inspection" of site 9. "His enthusiasm always brightened my day," says Lee.

Sam has given some thought to charging a fishing fee to compensate him for the loss of income from the land in the lake. "But I don't miss the land, and I like my neighbors to enjoy it, too," he says. He figures the flood prevention has already paid him—many times.—JOHN M. CROSS, *Assistant to the State Conservationist, SCS, Alexandria, La.* ♦

Water Quality

Water of acceptable chemical quality is water that requires no treatment before use or water from which dissolved minerals can be removed by economically feasible water-treatment methods. ♦

Conservation Challenges

By D. A. Williams

IN CASTING ABOUT for the right words to use in suggesting the significance and timeliness of this First Pan American Soil Conservation Congress, I came upon a paper by Dr. F. Fraser Darling, a distinguished British conservationist known by many of us here. Dr. Darling has written:

"Conservation is reaching forth to a larger concept than caring in an earnest but rather hazy way for animal species, for forests, soils or fresh waters; it is becoming the care of the human habitat, which is the whole planet."

Let me repeat the key words of that passage:

"Conservation is reaching forth to a larger concept . . . it is becoming the care of the human habitat, which is the whole planet."

That indeed is why we are here —or why we should be here.

—Not because poor soils yield poor crops but because poor soils make poor people.

—Not because of what soil erosion does to land but because of what it does to men, women, and children, in our crowded cities as well as in our developing rural areas.

—Not because of what fire or flood can do to the beauty and productivity of the forest or valley but because of what they can do to hope and dignity of human beings who live and work there.

—Not because we need a vanishing species of wildlife for its meat or feathers, but because we have no right to deprive future generations of any of the fullness of the world as God created it.

—Not because we seek some ethereal harmony between man and Nature, but because we seek peace between man and man—a peace that rests in large measure upon the conservation and development of soil and water resources from which people draw their sustenance in every part of the world. . .

* * *

The term "soil conservation" has come to signify those combinations of skills and practices needed to develop and sustain the productivity of each kind of soil for whatever purpose it is used—whether that use is for crops, for forest, for recreation, or for housing.

Soil conservation means choosing the appropriate use for each piece of land as well as protecting and improving the land after the use has been chosen.

Soil conservation means the careful planning and treatment of entire operating units, be they farms or ranches or entire watersheds.

Soil conservation means working out land use and treatment in full recognition of the essential relationships between soil, water, plants, animals, and—yes—man himself.

The greatest danger, as conservation technology advances, is that we may fail to involve the human element. (Remember Dr. Darling's allusion to the "*human* habitat.") Conservation must be *people*-centered. It must not only be carried out *for* people. It must be carried out *by* people.

To be fully effective, conservation decisions must always be made by the people who will be responsible for carrying them out. Conservation will never be accomplished by edict. Government can and must be an active partner, but should do for people only what they cannot do for themselves.

From remarks before the First Pan American Soil Conservation Congress in Sao Paulo, Brazil, April 12, 1966.

Conservation *will* move forward if it is viewed and accepted by land owners and operators as a means of making more efficient use of their soils, with higher yields per acre or hectare, with lower costs per kilo or ton, with better net income for the farmer or rancher.

It *will* go forward if city people are made partners, if they are helped to see their stake in soil and water resources, and if they are invited to work with rural people in soil and water conservation endeavors.

Rural and urban people both benefit from accelerated soil and water conservation programs. With better income, farmers can not only afford better education and medical care but can purchase more of the products and services offered by urban people. Urban water supplies are improved, flood threats diminished, and the entire community, and thus the Nation, benefits and prospers.

* * *

It seems to me that two great challenges emerge to conservationists in this changing world:

(1) To seek out diligently and utilize the best and most advanced technology available to adjust resource use to the mounting demands of population growth and rising living standards.

(2) To educate our people—all our people—in the principles of resource conservation so that they can and will act and exert leadership as informed citizens.

Let us hope that out of this Congress will come other challenges and specific proposals for action within and between our nations.

Is it too much to expect that we might, for example, look forward to a greatly accelerated flow of information between technicians and scientists in specific subject matter fields?

Is it possible that we may find opportunities for further exchanges of technicians and scientists, so that we share to the maximum the experiences of each country?

Could we look toward the formation of international councils or panels that would carry forward, on a permanent basis, the continuing review of hemispheric conservation needs and problems which we have begun to explore at this Congress?

Could there come from this Congress a nonpolitical manifesto that would assert the resolve of our nations to work together with new determination in the development of the science and art of good land use for the benefit of all people, here in this hemisphere and throughout the world?

I know that my fellow conservationists from the United States join me in expressing our deep appreciation to the sponsors and planners of this great Congress. We pledge to you all the cooperation that lies within our power to achieve our mutual goals.

It is in your hands and mine to carry forward action that could spell survival or destruction of the human race.

It is *that* important! ♦

Careers in Natural Resource Conservation. By Fred W. Herbert. *1965. Henry Z. Walck, Inc., New York. 110 pages, illus. $3.75.*

Written by one whose 46-year career was spent in the field of natural resource conservation, this book provides for high school students as well as guidance counselors some valuable insights into seven career areas—soil science, agronomy, range conservation, conservation forestry, conservation biology, conservation engineering, and soil conservation. Interwoven into the broad general descriptions of the work of professionals in these fields is a good deal of basic information about soil and water conservation.

Herbert, until recently assistant State conservationist for SCS in California, has limited his discussion mainly to careers with Federal agencies, especially the Soil Conservation Service. Opportunities with private industry and State agencies are briefly mentioned.

One chapter is devoted to qualifications for a career in conservation. It explains Civil Service requirements and gives salary ranges in the various Federal General Schedule grades. The very brief chapter entitled "Conservation Aids and Technicians" provides useful information for those who do not have a college education.—Walter E. Jeske, *Information Division, SCS.*

The Geography of Soils. By Brian T. Bunting. *1965. Aldine Publishing Company, Chicago. 213 pp., illus. $5.*

In this compact book, an American publisher has given us a British professor's description of the soils of the world and a synthesis of major concepts regarding their morphology, classification, and distribution.

The author is lecturer in geography at the University of London. His concern is not with the management and use of soils but with their character and distribution as they occur in nature, undisturbed or under the use of man. The numerous literature citations with each chapter show that he has made a thorough and discriminating study of the world literature of the subject.

The book—each chapter, paragraph, and sentence—is logically organized and simply constructed, although heavily laden with technical data and terms. The result is a useful introduction to the subject for the technician who is not a soil scientist and for the general reader who is willing to consult a dictionary when he needs it.—B.O.

New Publications

Water in Industry. By National Association of Manufacturers and Chamber of Commerce of the United States. *1965. New York and Washington. 81 pp., illus. $2.* This booklet supersedes one by the same title published in 1950 presenting results of a survey conducted by the National Association of Manufacturers and the Conservation Foundation.

Here we have new data on the use of water by industry resulting from a new survey by the NAM, chamber of commerce, and 22 industrial and trade organizations acting in cooperation with the National Technical Task Committee on Industrial Waters.

Not only are new and more elaborate data provided, but they are interpreted in relation to the national water situation. Citizens, conservationists, and water use planners will find the industry viewpoint informative and stimulating. The warnings against glib and unthinking use of figures are well taken, and apply to the entire subject of water supply and use with as much force as to data on industrial use.

The following comment on a much-quoted statistic is representative:

"It takes 17,000 or 32,000 or 65,000 gallons of water to make a ton of finished steel, depending upon which author you happen to be reading. The numbers for a gallon of gasoline run from 7 to 70 gallons. . .

"While unit figures are plentiful, reliable ones are not. The 'usage' for steel is most commonly sited as 65,000 gallons per ton; this survey reports the withdrawal as less than one-third that amount.

"Such discrepancies have varied origins. 'Guestimates' of years long past are still being quoted. Improved conservation practices have cut withdrawals. Recirculation instead of withdrawal quantities may be quoted through a misunderstanding of the distinction, or broad conclusions drawn from a few nontypical figures."

Likewise, the hazards of using national averages are likened to the story of the statistician who "drowned while wading across a river whose average depth he had computed as 2.16 feet."

The industry report argues strongly for constant questioning of the uncertain figures on water resources, including those in the current report.—B.O.

Land Resource Regions and Major Land Resource Areas of the United States. By Morris E. Austin. *1965. USDA Agr. Hdbk. 296. 88 pp., map in pocket. ($1.00)*

The handbook provides the first published description of the generalized soil areas and land resource regions of the United States.

The map is an updating, revision, and redesigning of the 1950 map, "Problem Areas in Soil Conservation," prepared by the Soil Conservation Service. It delineates 156 major land resource areas based primarily on general soil maps (or soil association maps) but characterized also by climate, water resources, land uses, and type of farming. They make use of information from soil surveys and other sources available through 1964.

The areas are grouped into 21 land resource regions based on relationships significant to agriculture and resource conservation. Some of the regional boundaries cut across basic physiographic divisions usually used to characterize natural landscape features.

Following a brief generalized description of each region, its component areas are described as to land use, elevation and topography, climate, water, and soil. These descriptions, previously unpublished, comprise the major content of the book.

The Effect of Soils and Fertilizers on the Nutritional Quality of Plants. By U. S. Plant, Soil, and Nutrition Laboratory Staff. *1965. USDA Agr. Inf. Bul. 299. 24 pp., illus.*

A summary report compiled by the staff of the Plant, Soil, and Nutrition Laboratory, Agricultural Research Service, Ithaca, N. Y., answers, on the basis of present knowledge, the recurring question of how the quality of soils affects the quality of food and feed grown on them.

"As far as the people of the United States are concerned," the publication says, "our varied diet, composed of animal products, fish, plants, and plant products, originating in different parts of the country, makes it very unlikely that the deficiencies of any one kind of soil will have an adverse effect on human nutrition. Our farm animals, however, are sometimes largely fed on just a few plant species, grown on just a few kinds of soil, so noticeable effects of the soil upon the nutrition of farm animals are more common."

The report discusses in some detail a number of aspects of this very complicated question.

Indians of North Carolina. By Bureau of Indian Affairs. *1965. U. S. Dept. of Int. 12 pp., illus. $0.15.* The story of the Cherokees and their exodus to Oklahoma is followed by a description of the life today of those remaining in and around the Cherokee Reservation in North Carolina.

White and Nonwhite Owners of Rural Land in the Southeast. By Robert F. Boxley, Jr. *1965. USDA Econ. Res. Serv. ERS 238. 23 pp., illus.* Information based on data from survey to determine the patterns of rural landownership in Alabama, Florida, Georgia, North Carolina, South Carolina, Tennessee, and Virginia.

Flow Resistance in Simulated Irrigation Borders and Furrows. By Agricultural Research Service. *1965. USDA Cons. Res. Rpt. 3. 56 pp., illus.* Technical report of results of hydraulic laboratory studies "to develop the relations necessary for predicting resistance to flow in irrigation borders and furrows without trial resistance runs."

The Demand and Price Situation for Forest Products.—1965. By Dwight Hair and Alice H. Ulrich. *1965. USDA Misc. Pub. 1009. 43 pp., charts.*

New Product Development for Economic Growth in Rural Areas. By Agricultural Research Service. *1965. USDA Misc. Pub. 1031. 11 pp.*

Soil Surveys

Prineville Area, Oregon. By R. W. Mayko and George K. Smith. *1966. 89 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Fieldwork by George K. Smith and Harold Biggerstaff, SCS, and Elwood Dull, Oregon Agricultural Experiment Station.

Marlboro County, South Carolina. By Richard W. Craft, Jr. *1965. 109 pp., illus.; maps 3.17 inches to the mile (1:20,000).* Fieldwork by Richard W. Craft, Jr., W. L. Colburn, F. L. Green, C. B. Lawrence, J. J. Pitts, T. R. Gerald, and W. J. Camp.

Grand Traverse County, Michigan. By Herman L. Weber, Robert Hall, Nels R. Benson, and G. Van Winter. *1966. 141 pp., illus.; maps 4 inches to the mile (1:15,840).*

Crosby County, Texas. By William M. Koos, Lee A. Putnam, and Wayburn D. Mitchell. *1966. 70 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

From the Administrator:

Model for Rural Development

WE ARE especially pleased with the continuing upward trend in the number of multiple-purpose watershed projects being planned and placed under construction under Public Law 566. These projects are serving as the catalyst for an acceleration in community development in many rural and small town areas and even in some urban situations.

Of the 712 projects approved for operations as of January 1, 346 or 49 percent were multi-purpose. That is, they included purposes other than watershed protection and flood prevention; namely, agricultural water management, recreation, municipal and industrial water supply, or fish and wildlife habitat improvement.

In contrast, as of January 1, 1960, only 30 percent, or 63 out of a total of 212 projects in operation, were multi-purpose.

Some of the reasons for the increase in multi-purpose developments may be of interest.

The problems that need solution in small watershed communities are as diverse as the landscape of America. In some areas the major problem is flooding; in others drainage; in some, the need is for improved irrigation; in still others, there is increasing need for recreation facilities, municipal and industrial water supply, fish and wildlife improvement, or some other improvement in the use of water resources.

These are problems that usually cannot be solved by individuals working alone. They require joint action under a common plan with some form of cooperative local initiative and leadership. To this must be added some form of State and Federal aid, to the extent required, to supplement local resources in carrying out planned improvements.

Small watershed projects offer an opportunity to interrelate land treatment and structural measures for any of the desired water management objectives. Such a diversified approach can serve the needs of almost any small watershed community. This multi-purpose possibility is, no doubt, a major factor in the widespread interest that has stimulated the phenomenal growth of the program.

So it is that the small watershed program offers a practical approach to revitalizing rural communities. It is based on complete utilization of available resources, including natural, human, financial, and technical. Organized local groups, with representation from varied interest groups and a desire for community improvement, can use the multiple services available to build an improved economy for their people.

These projects serve both town and country people. Many small towns in rural areas have critical needs for flood prevention, new recreation facilities, and additional municipal and industrial water supplies. Many small towns are taking advantage of the opportunity afforded by Public Law 566 projects to obtain these improvements.

A new water supply can change the economy of a commuity by bringing in new businesses or expanding old ones, inevitably leading to more jobs and a general expansion of the economy.

Recreational developments are proving to be most popular in many small watershed projects in rural communities. As of January 1 of this year 93 projects had included recreation as a part of their multi-purpose developments.

Striking income gains for a community also result from recreational developments. Many types of related business enterprises, such as motels, restaurants, retail outlets for boats, fishing supplies, and other merchandise often follow these community developments.

More and more attention is being given by watershed project sponsors to the potential opportunities for enhancing and developing fish and wildlife resources as a part of multi-purpose developments. A joint task force of the U. S. Departments of Interior and Agriculture is providing valuable encouragement and assistance to local sponsors in developing plans for desirable fish and wildlife improvements in small watershed projects.

Basic to all watershed projects, of course, is appropriate conservation treatment of the land in the watershed area. We must not lose sight of the fact that the *first* purpose is *watershed* protection.

Land use adjustments from cropland to other uses are a fundamental need in many projects. Such adjustments, coupled with needed conservation practices, aid in achieving the needed hydrologic and sediment-reduction effects. In turn, the community benefits from improved water quality as a result of the reduction in sediment pollution.

The multiple-purpose approach in the small watershed program is an important part of the Department of Agriculture's effort to help rural people improve their environment. The primary objective is better living for people in the country, both farm and nonfarm. The small watershed program, having already proved itself in all sections of the country, offers a practical model for the more ambitious efforts now being initiated by the Department to bring coordinated community development to all of rural America.

D. A. WILLIAMS

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Road Dams Stop Erosion and Enhance Beauty

Story on Page 227

Small lakes like this dot watersheds in the loess soil areas of Nebraska and Iowa where drop-inlet structures are rapidly replacing bridges across the many gullies that cut the countryside.

The structures stabilize the grades in once-active gullies and enable farmers to establish successful erosion control on watershed lands. They also save tax money by reducing highway costs.